IN THE CLAIMS

A complete set of claims, showing current status and amendments, is presented below.

1. (previously presented) A semiconductor optical device, comprising:
a substrate;
first and second semiconductor side regions formed over the substrate; and
a semiconductor ridge disposed between the first and second side regions and over the substrate forming an optical waveguide within the device, a height of the semiconductor ridge above the substrate being greater than heights of the first and second side regions above the substrate, the height of the first side region above the substrate, at a point along the waveguide, being different from a height of the second side region above the substrate, at the point along the waveguide.

2. (original) A device as recited in claim 1, further comprising an active semiconductor region formed between the ridge and the substrate, the ridge guiding light amplified in the active semiconductor region.

3. (original) A device as recited in claim 1, further comprising an electrode disposed over the ridge to inject current into the ridge.

4. (original) A device as recited in claim 1, wherein the device comprises a semiconductor laser.

5. (original) A device as recited in claim 1, further comprising a frequency selector optically coupled to the active region.

6. (original) A device as recited in claim 5, wherein the frequency selector is a fiber Bragg grating coupled to an optical output from the semiconductor laser.

7. (original) A device as recited in claim 1, wherein the first and second side regions

define an average side region height above the substrate, and a kink current of the laser is higher than where the heights of the first and second side regions above the substrate are both equal to the average side region height.

8. (original) A device as recited in claim 1, further comprising a current controller coupled to inject current through the ridge.

9. (original) A device as recited in claim 1, wherein the substrate is thermally coupled to a cooler to remove heat from the substrate.

10. (original) A device as recited in claim 9, wherein the cooler includes a thermoelectric cooler, and further comprising a cooler controller coupled to control operation of the thermoelectric cooler.

11. (original) A device as recited in claim 1, further comprising at least one bond pad disposed on at least one of the first and second side regions, an electrode over the ridge being electrically coupled to the at least one bond pad, and a submount attached to the substrate, the submount being coupled to a laser carrier.

12. (previously presented) An optical communications system, comprising:

an optical transmitter;

a fiber optic link coupled to receive optical signals from the optical transmitter;

an optical receiver coupled to the fiber optic link to receive the optical signals;

and

a laser coupled to inject light into the fiber optic link, the laser including

a substrate;

first and second semiconductor side regions formed over the substrate; and

a semiconductor ridge formed between the first and second side regions and over the substrate to introduce an optical waveguide within the device, a height of the semiconductor ridge above the substrate being greater than the

heights of the first and second side regions above the substrate, the height of the first side region above the substrate, at a point along the waveguide, being different from a height of the second side region above the substrate, at the point along the waveguide.

13. (original) The system as recited in claim 12, wherein the laser is disposed within the optical transmitter.

14. (original) The system as recited in claim 12, wherein the fiber optic link includes at least one fiber amplifier unit having a length of fiber amplifier, the at least one fiber amplifier unit including the laser coupled to inject pump light into the length of fiber amplifier.

15. (original) The system as recited in claim 12, wherein the laser includes a frequency selector to select an output wavelength of pump light generated by the laser.

16. (original) The system as recited in claim 12, wherein the optical transmitter includes control circuitry to control operation of one or more transmitter lasers within the optical transmitter and one or more respective modulator units to receive incoming information and modulate the incoming information onto light produced by the one or more lasers.

17. (original) The system as recited in claim 12, wherein the optical transmitter includes at least two lasers operating at different wavelengths and a wavelength multiplexing unit to multiplex output light from the at least two lasers into a single output signal.

18. (original) The system as recited in claim 12, wherein the optical receiver includes a wavelength demultiplexing unit to separate the optical signals into components of different wavelength, and respective detectors to detect signals at the different wavelengths.

19. (currently amended) A semiconductor laser, comprising:

a substrate having an upper surface, a lateral direction being defined parallel to

the upper substrate surface;

one or more superstrate layers provided on the substrate; and

an optical waveguide disposed over the substrate to guide light passing between ends of the substrate and defining a fundamental optical mode, first and second sides of the optical waveguide providing optical confinement in the lateral direction, the optical confinement for the fundamental optical mode provided on the first side of the optical waveguide being different from the optical confinement provided on the second side of the optical waveguide, the waveguide including a ridge waveguide formed from a semiconductor ridge disposed along the substrate, a depth of the optical waveguide relative to a base of the semiconductor ridge on the first side of the optical waveguide being different from a depth of the optical waveguide relative to the base of the ridge on the second side of the optical waveguide.

20-21. (canceled)

22. (original) A laser as recited in claim 20, further comprising an electrode disposed over the ridge to inject current into the ridge.

23. (original) A laser as recited in claim 19, further comprising a frequency selector optically coupled to the optical waveguide.

24. (original) A laser as recited in claim 23, wherein the frequency selector is a fiber Bragg grating coupled to an optical output from the semiconductor laser.

25. (original) A laser as recited in claim 19, wherein the first and second sides of the optical waveguide define an average waveguide confinement, and a kink current of the laser is higher than where the first and second sides of the optical waveguide each provide the average waveguide confinement.

26. (original) A laser as recited in claim 19, further comprising a current controller

coupled to inject current through the ridge.

27. (original) A laser as recited in claim 19, wherein the substrate is thermally coupled to a cooler to remove heat from the substrate.

28. (original) A laser as recited in claim 27, wherein the cooler includes a thermoelectric cooler, and further comprising a cooler controller coupled to control operation of the thermoelectric cooler.

29. (currently amended) An optical communications system, comprising:

an optical transmitter;

a fiber optic link coupled to receive optical signals from the optical transmitter;

an optical receiver coupled to the fiber optic link to receive the optical signals; and

a laser coupled to inject light into the fiber optic link, the laser including

a substrate;

one or more superstrate layers provided on the substrate; and

an optical waveguide disposed over the substrate to guide light passing between ends of the substrate and defining a fundamental optical mode, first and second sides of the optical waveguide providing optical confinement in the lateral direction, the optical confinement for the fundamental optical mode provided on the first side of the optical waveguide being different from the optical confinement provided on the second side of the optical waveguide, the waveguide including a ridge waveguide formed from a semiconductor ridge disposed along the substrate, a depth of the optical waveguide relative to a base of the semiconductor ridge on the first side of the optical waveguide being different from a depth of the optical waveguide relative to the base of the ridge on the second side of the optical waveguide.

30. (original) The system as recited in claim 29, wherein the laser is disposed within

the optical transmitter.

31. (original) The system as recited in claim 29, wherein the fiber optic link includes at least one fiber amplifier unit having a length of fiber amplifier, the at least one fiber amplifier unit including the laser coupled to inject pump light into the length of fiber amplifier.

32. (original) The system as recited in claim 29, wherein the laser includes a frequency selector to select an output wavelength of pump light generated by the laser.

33. (original) The system as recited in claim 29, wherein the optical transmitter includes control circuitry to control operation of one or more transmitter lasers within the optical transmitter and one or more respective modulator units to receive incoming information and modulate the incoming information onto light produced by the one or more lasers.

34. (original) The system as recited in claim 29, wherein the optical transmitter includes at least two lasers operating at different wavelengths and a wavelength multiplexing unit to multiplex output light from the at least two lasers into a single output signal.

35. (original) The system as recited in claim 29, wherein the optical receiver includes a wavelength demultiplexing unit to separate the optical signals into components of different wavelength, and respective detectors to detect signals at the different wavelengths.

36-49. (canceled)